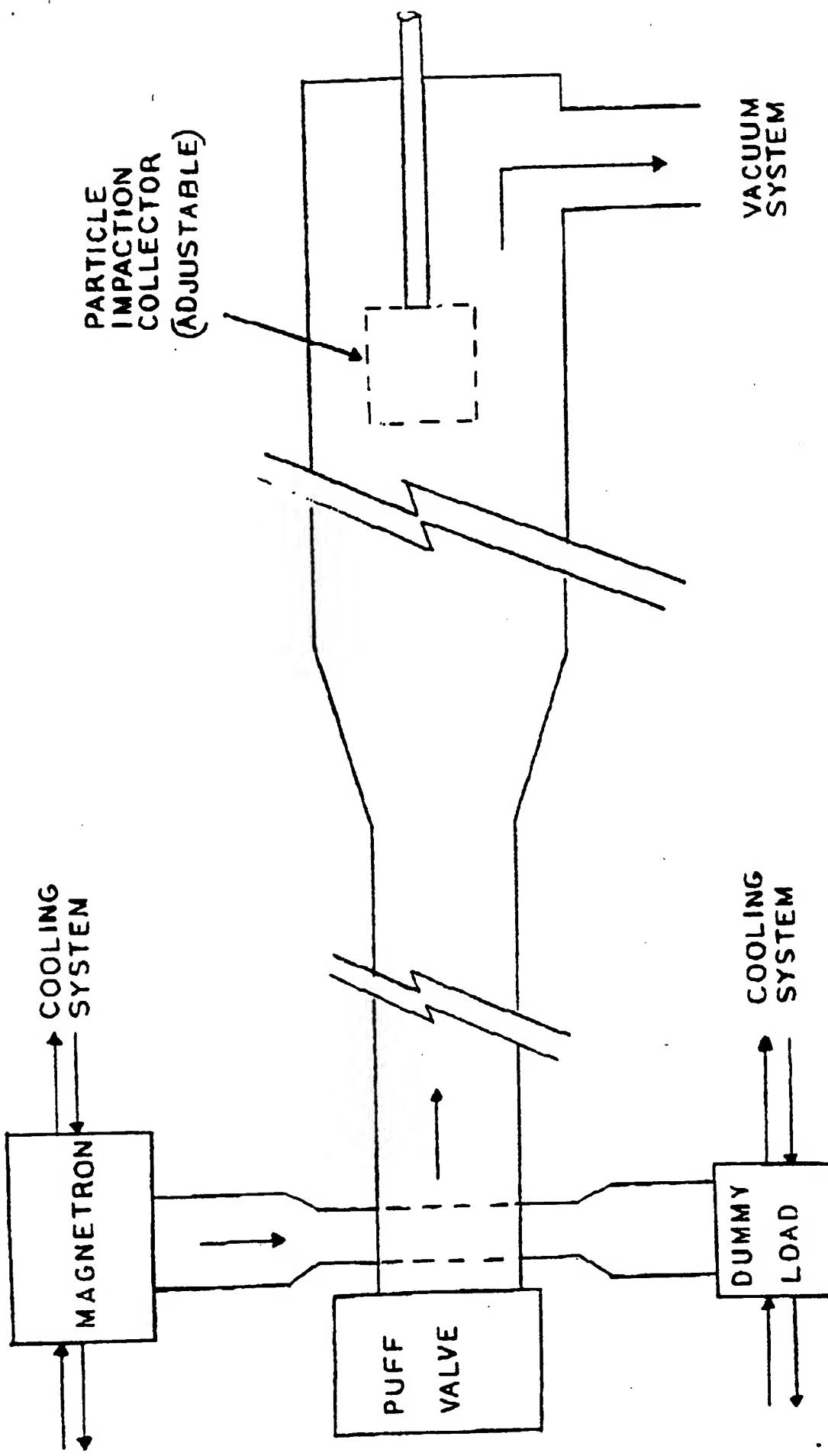


FIGURE 2. Diagram of Nontransferred Plasma Torch with Rapid Quench Reactor, Particle Trap, and Liquid N₂ Trap.

Fig 6



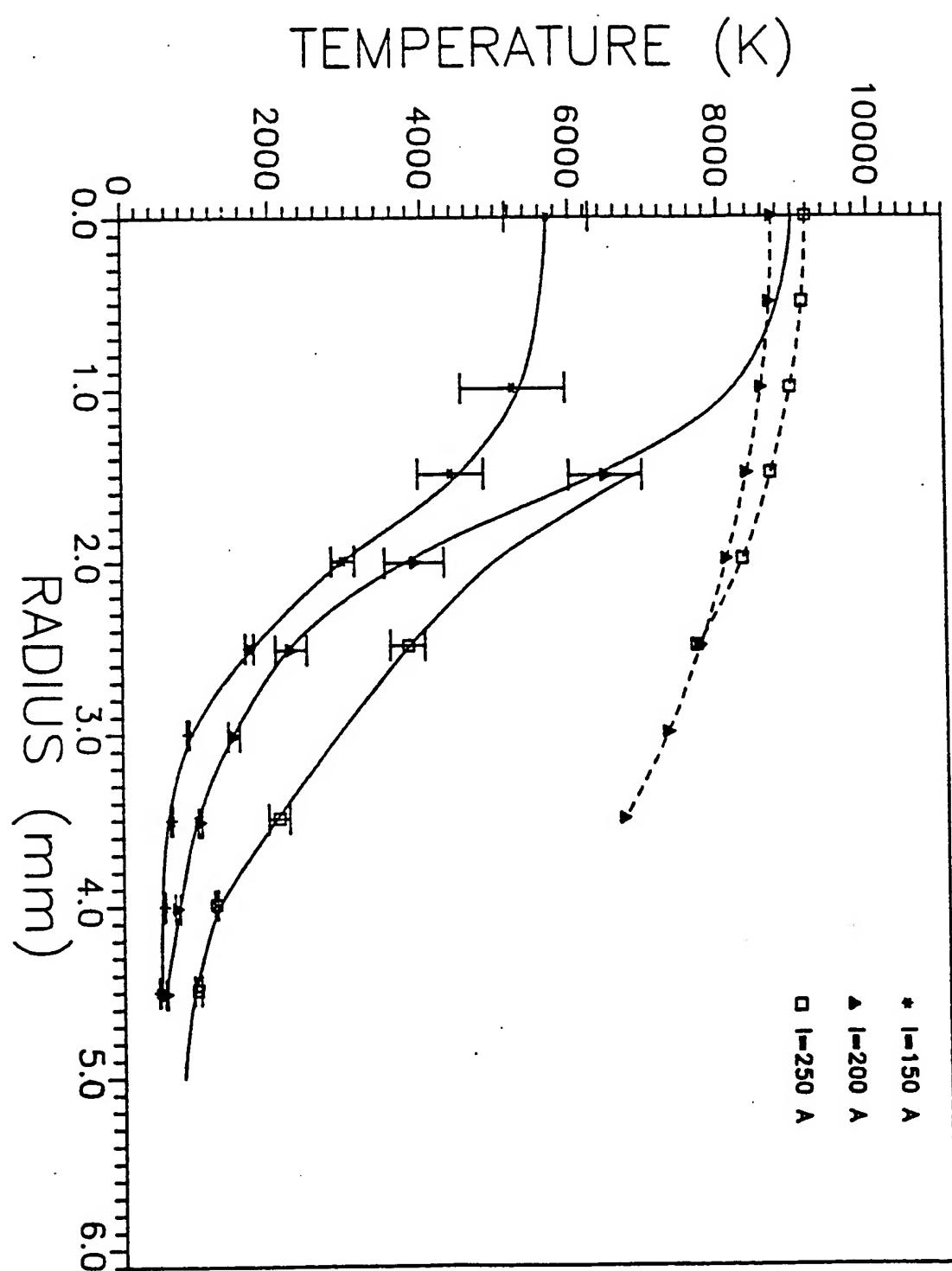
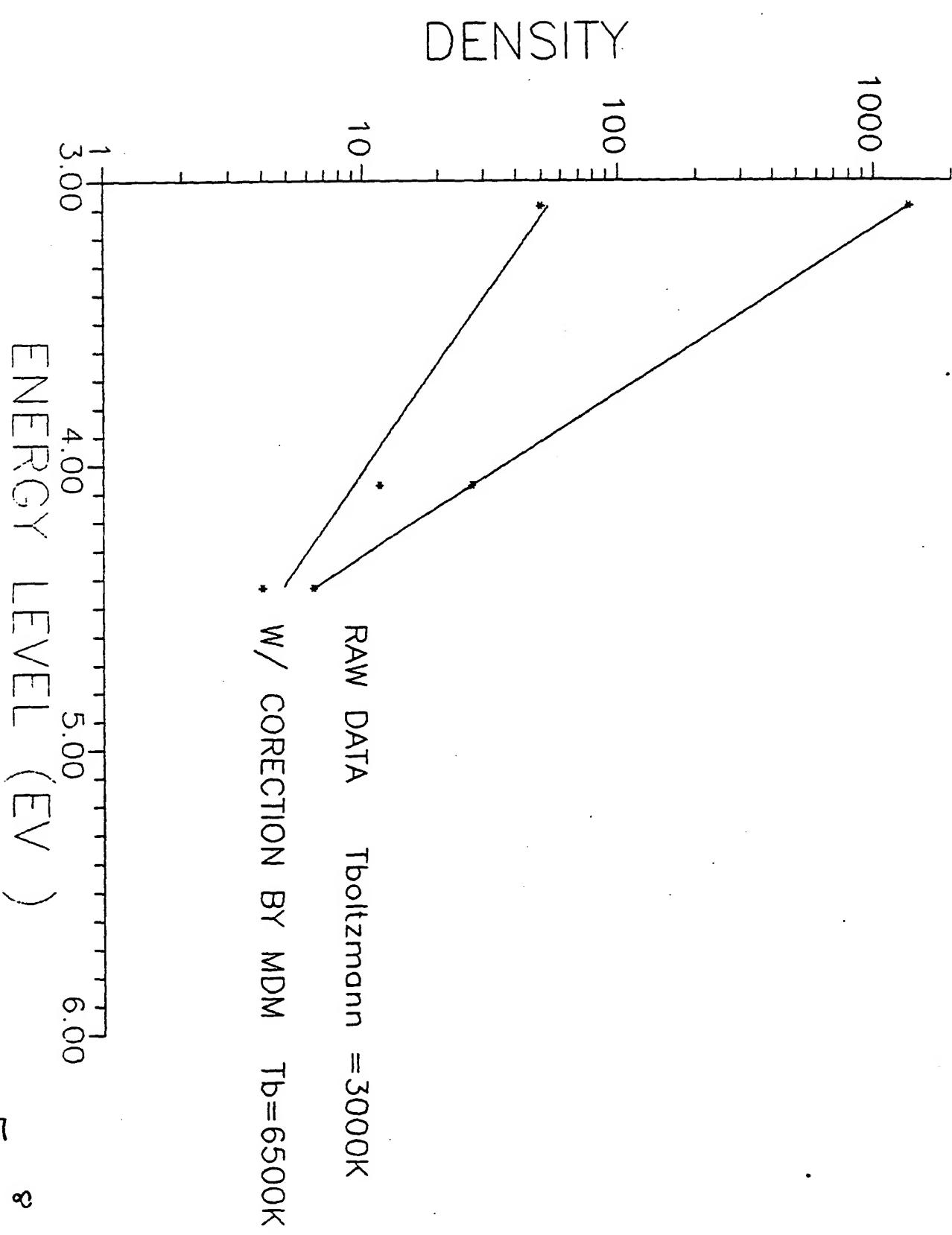
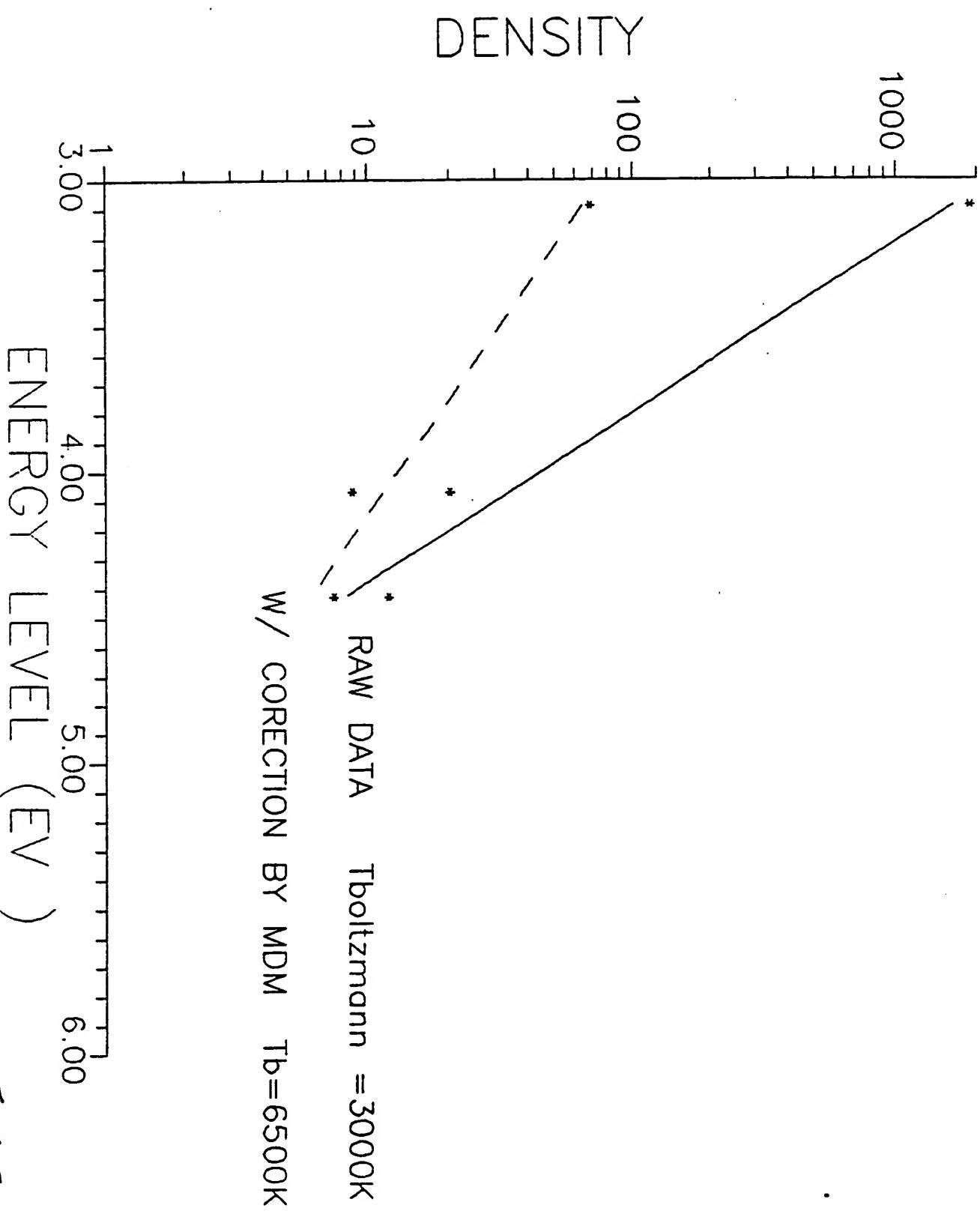
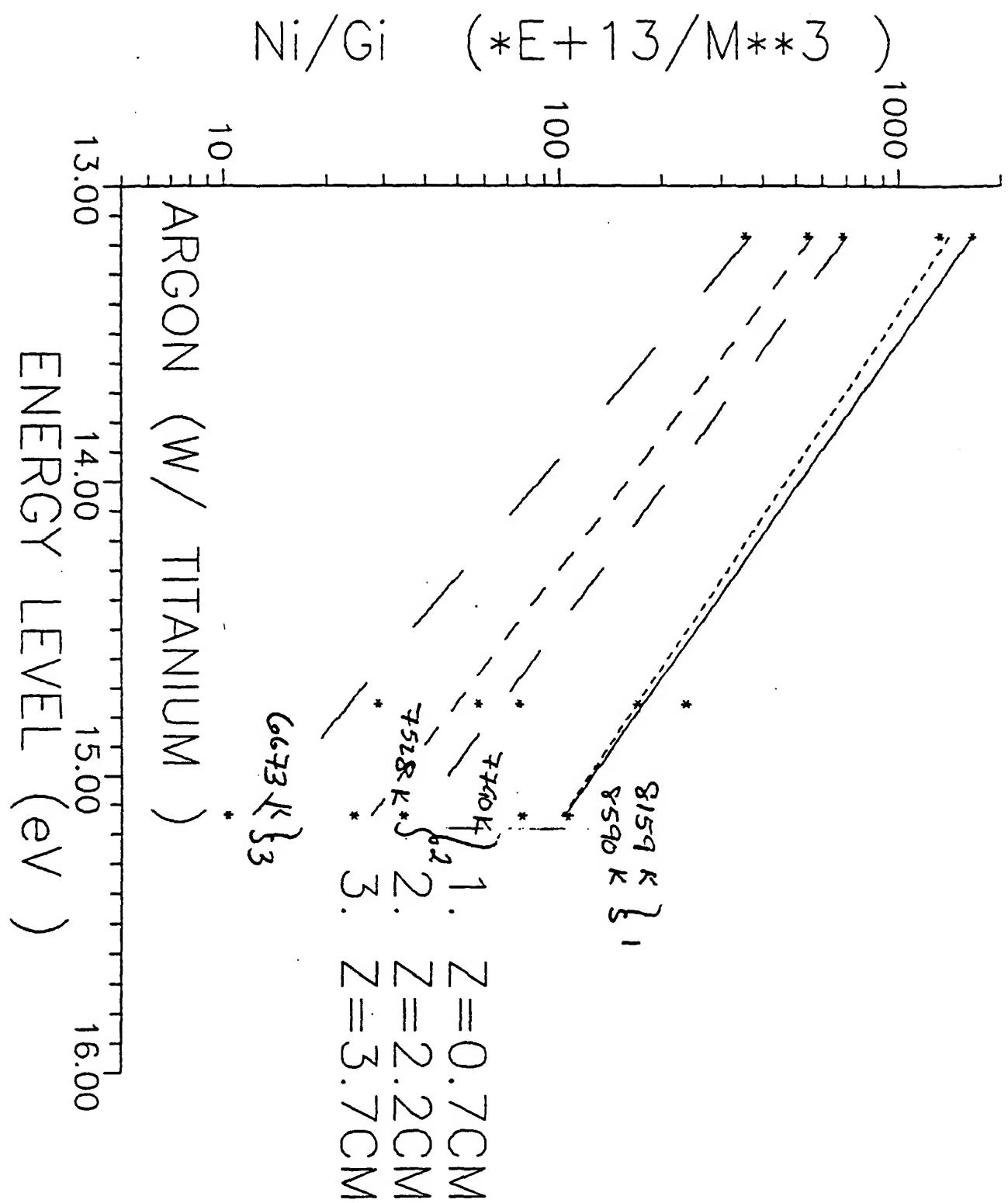


Fig. 7







Curve 724401-A

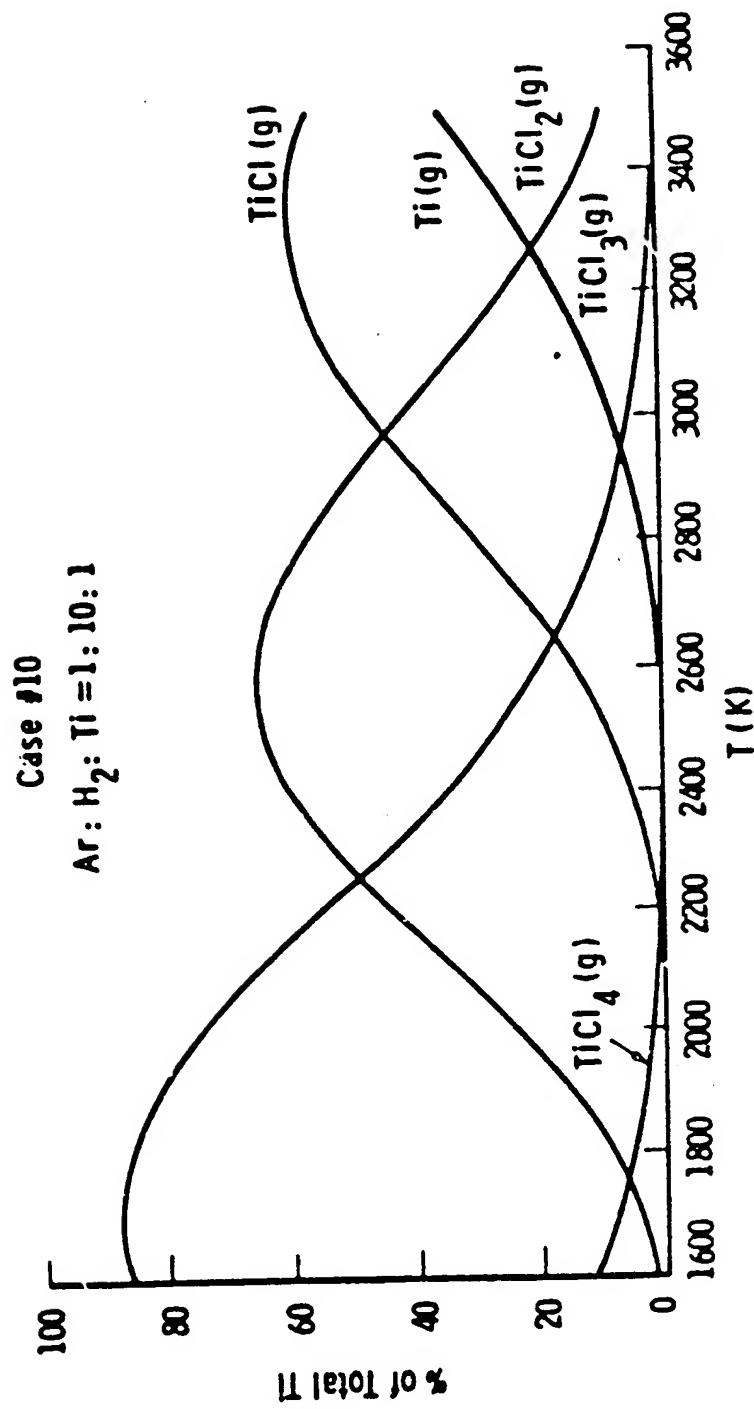


Fig. 1—Thermochemical equilibrium for the hydrogen reduction of TiCl₄

Curve 724393-A

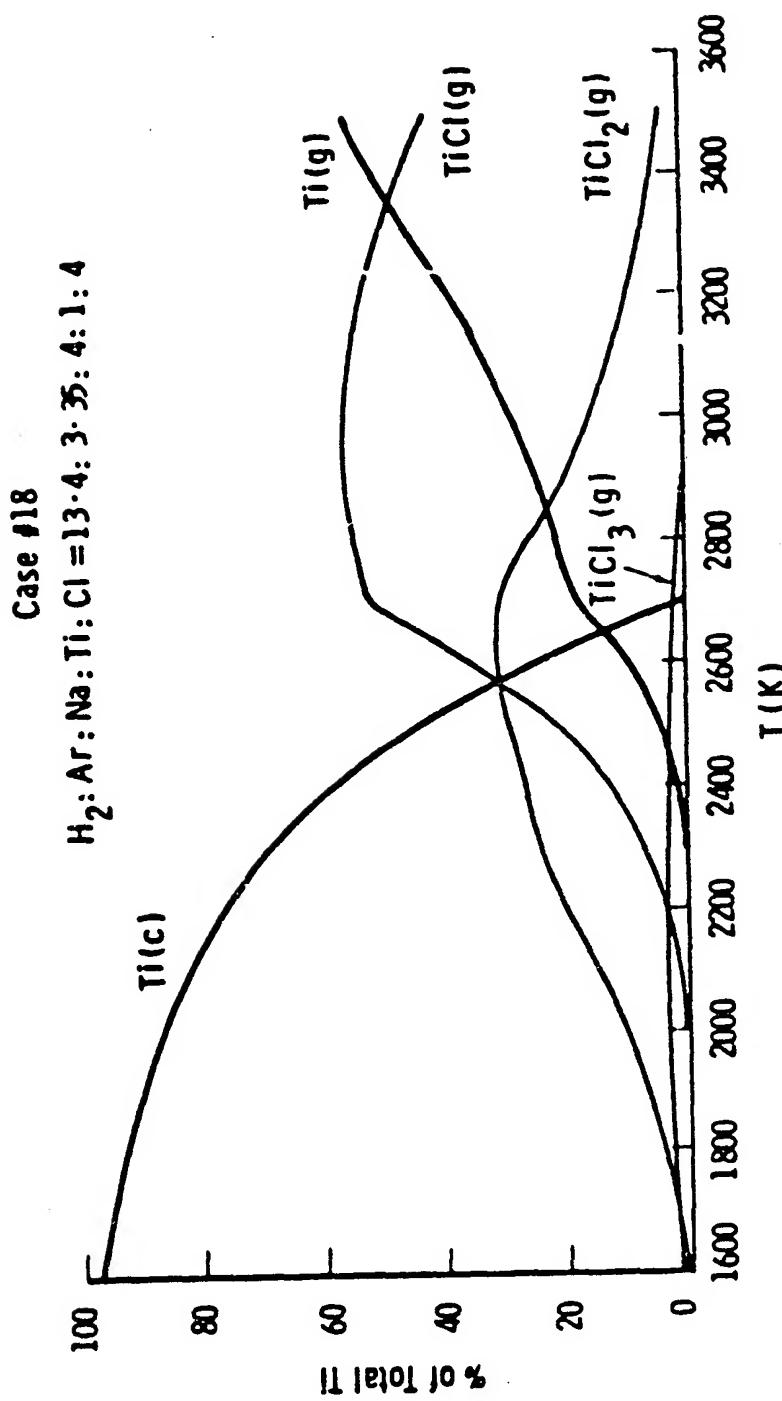


Fig. 2—Thermochemical equilibrium for the sodium/hydrogen reduction of $TiCl_4$

Curve 724395-A

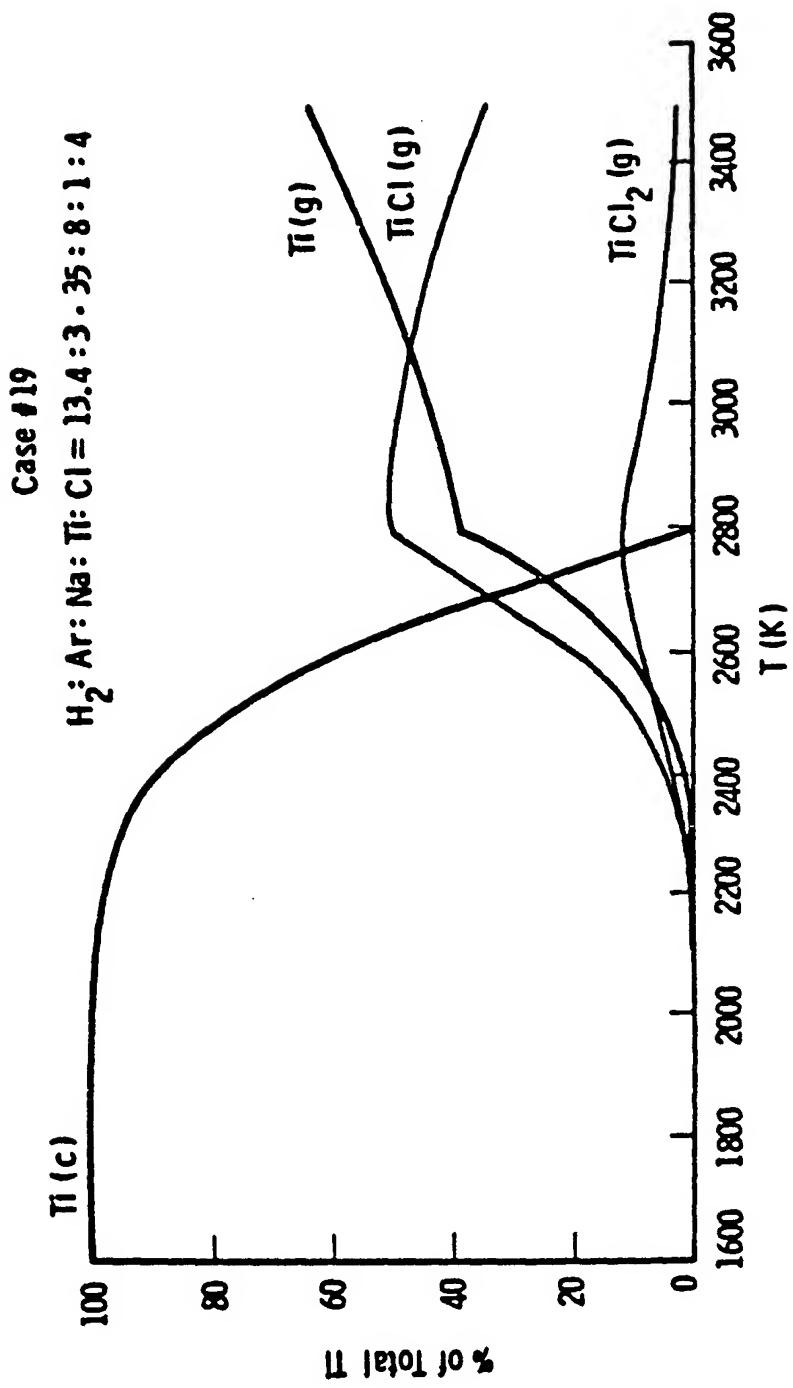
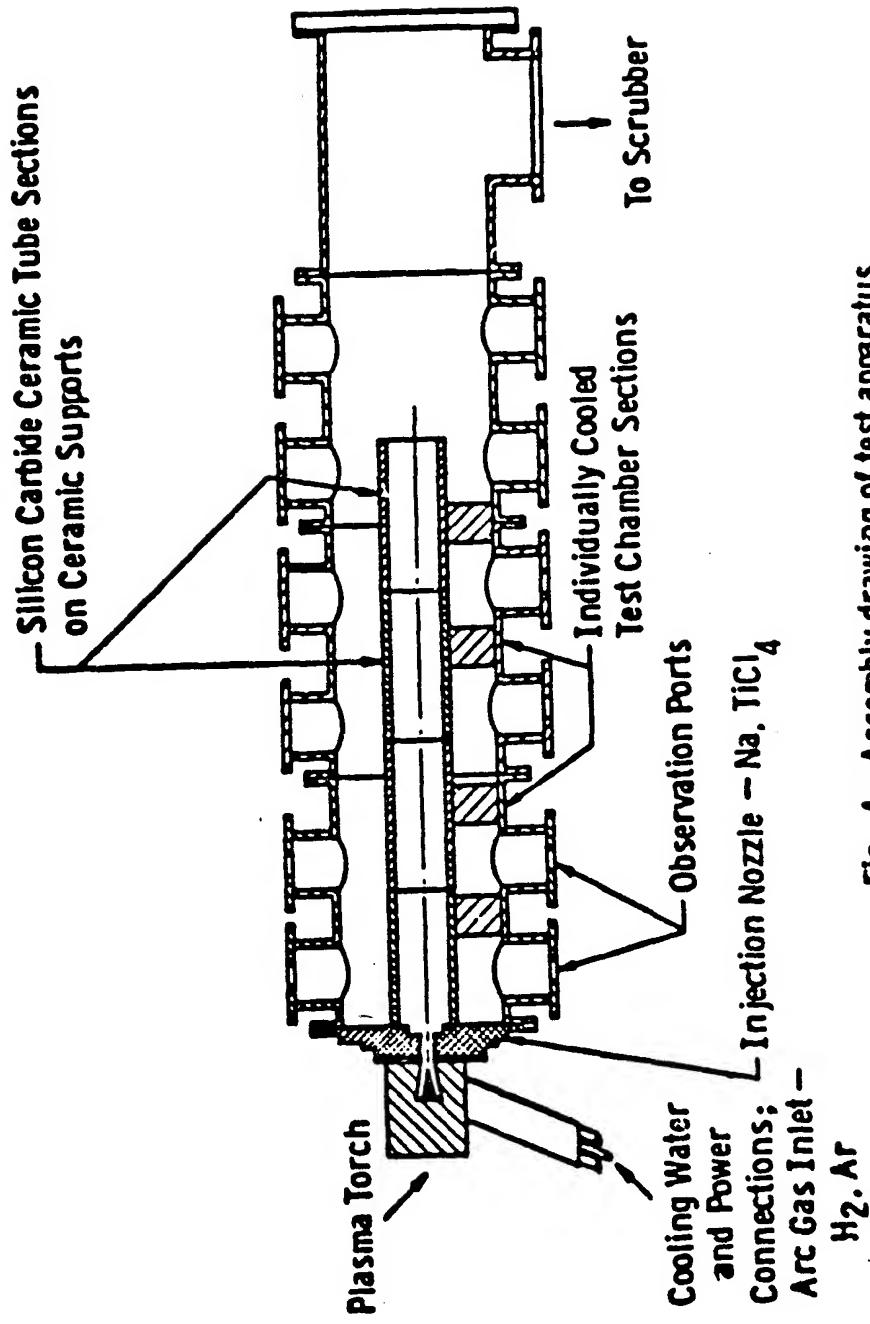


Fig. 3—Thermochemical equilibrium for the sodium/hydrogen reduction of $TiCl_4$ (excess sodium)

Fig. 7733485



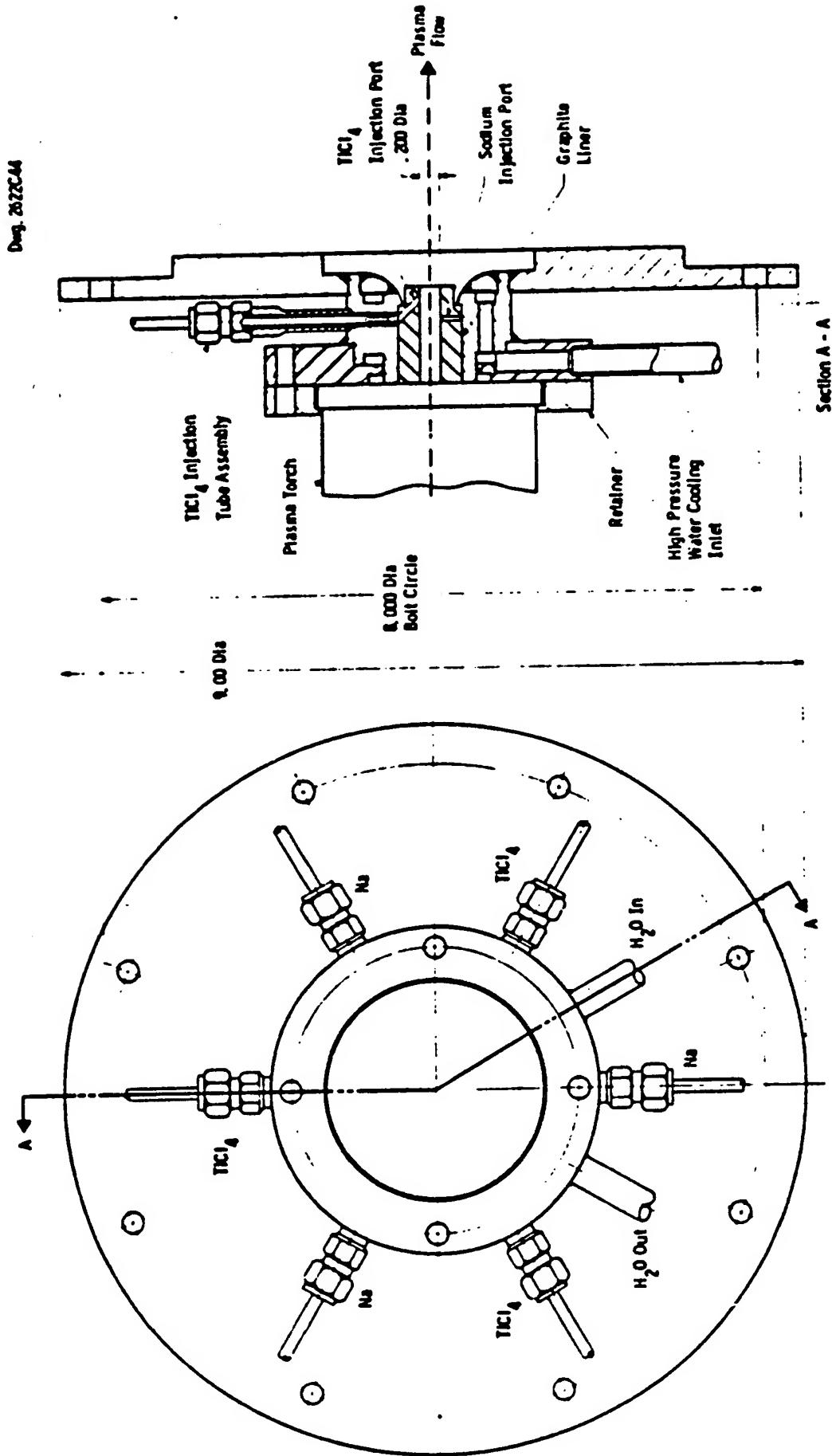
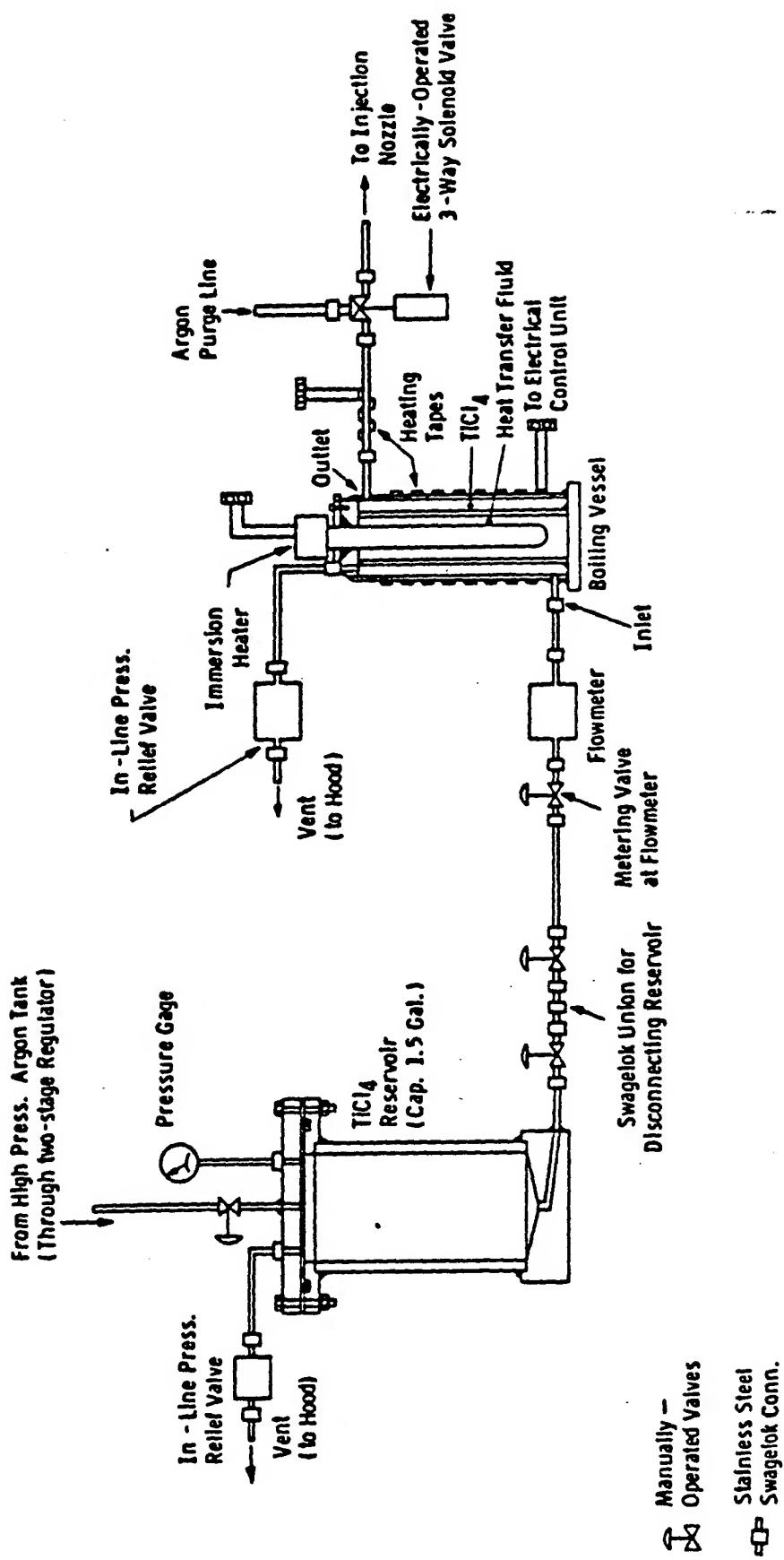




Figure 6 — Laboratory-scale 40 kW plasma reactor used to produce high quality titanium.



Figure 7. Photograph of Experimental Apparatus



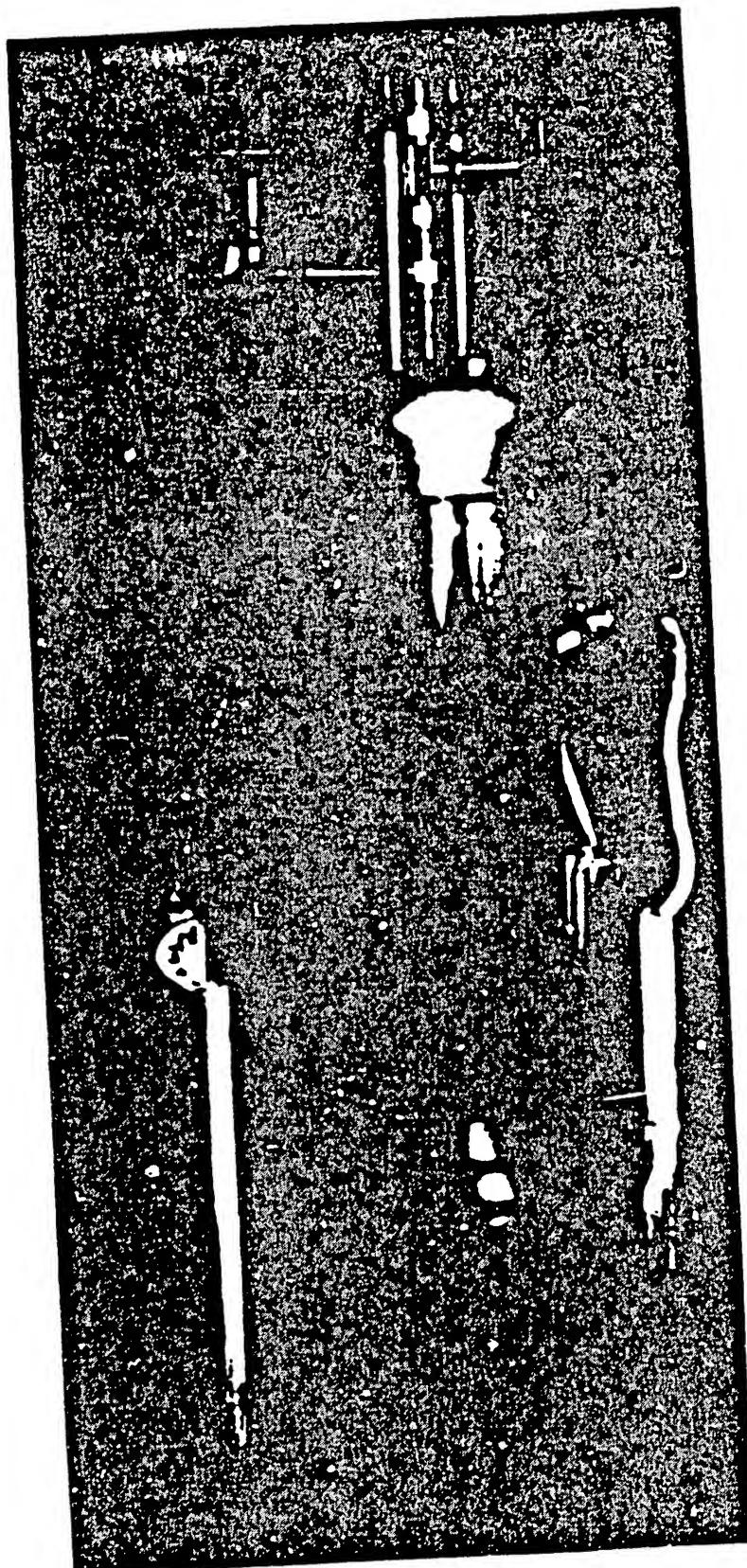


Figure 9. Ph tograph of the Sodium Storage Tank

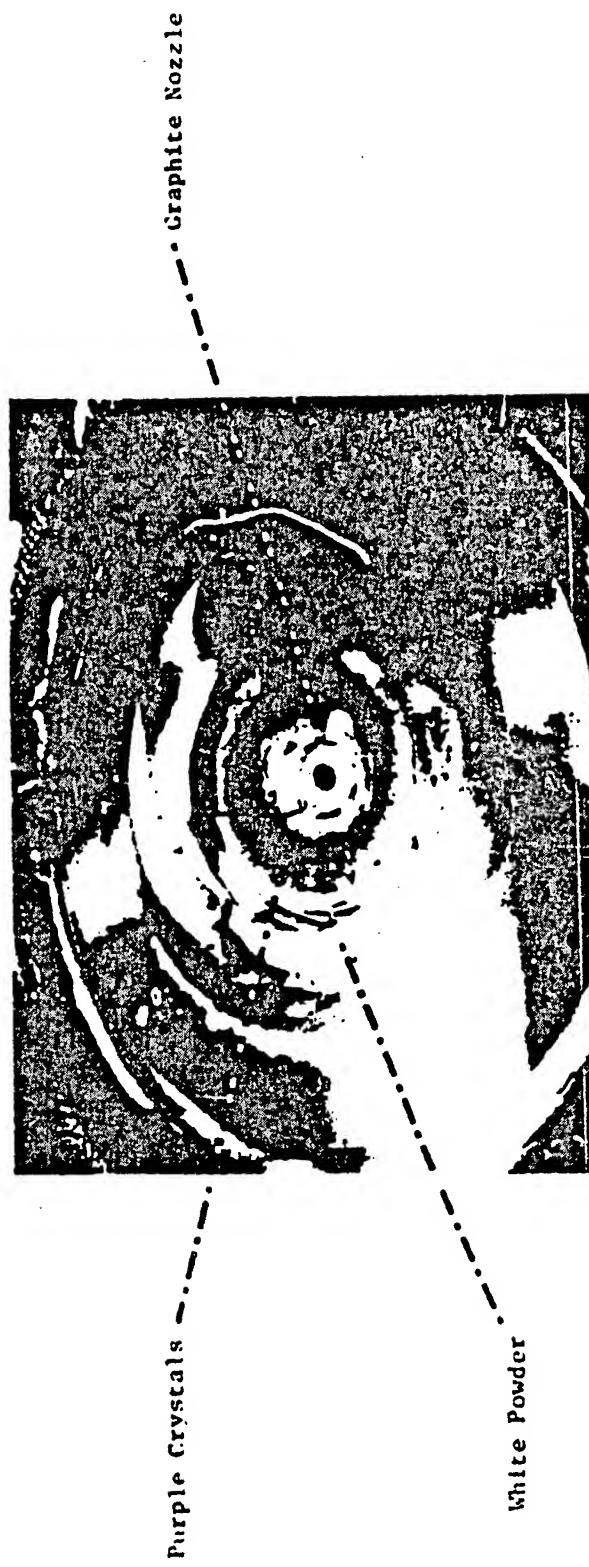


Figure 10. Plasma/Reactants Injection Flange After Experiment #1

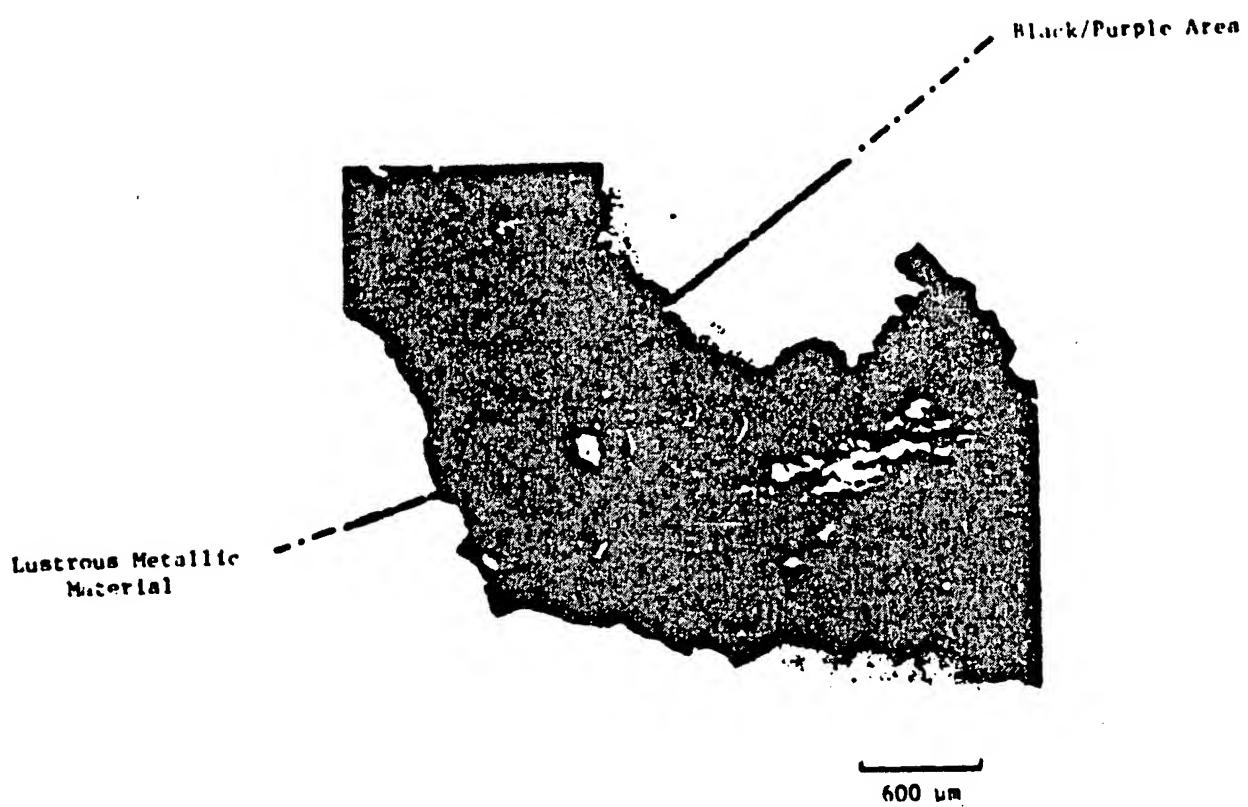


Figure 11. Optical Photograph of Titanium Product from Experiment #1

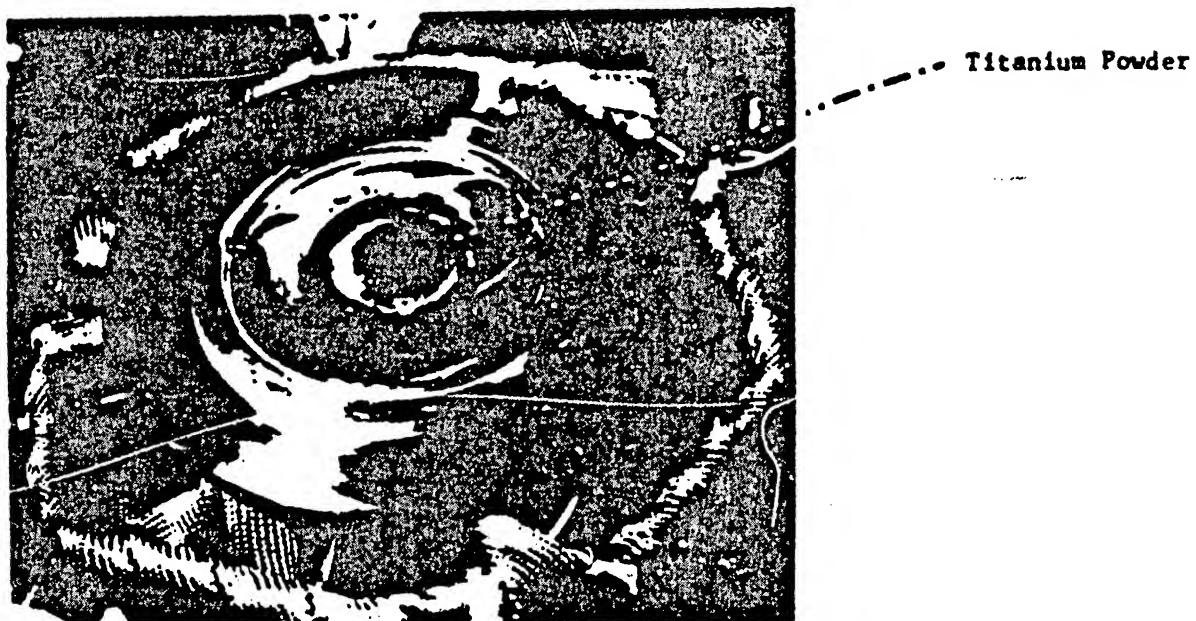


Figure 12. Plasma/Reactants Injection Flange after Experiment #2

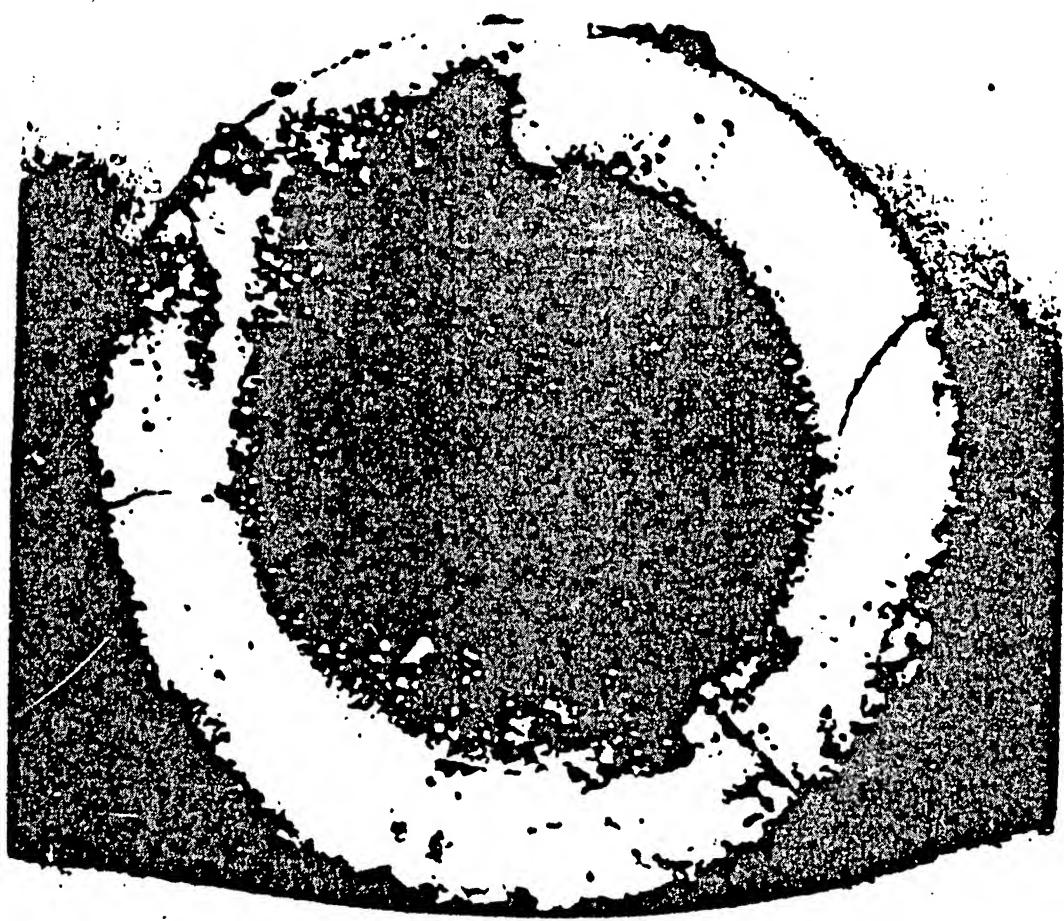
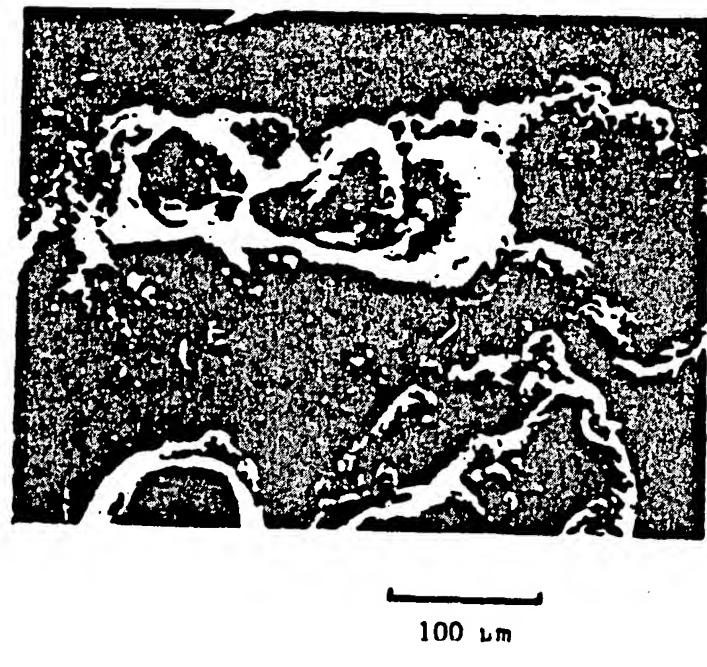


Figure 13. Silicon Carbide Reaction Tube (Hot End) after Experiment #2



Figure 14. Metallic Titanium Product from Experiment #2 (X100)



11
S E M / E D X A
111
51

Figure 15. SEM/EDXA Analysis of Product from Experiment #1

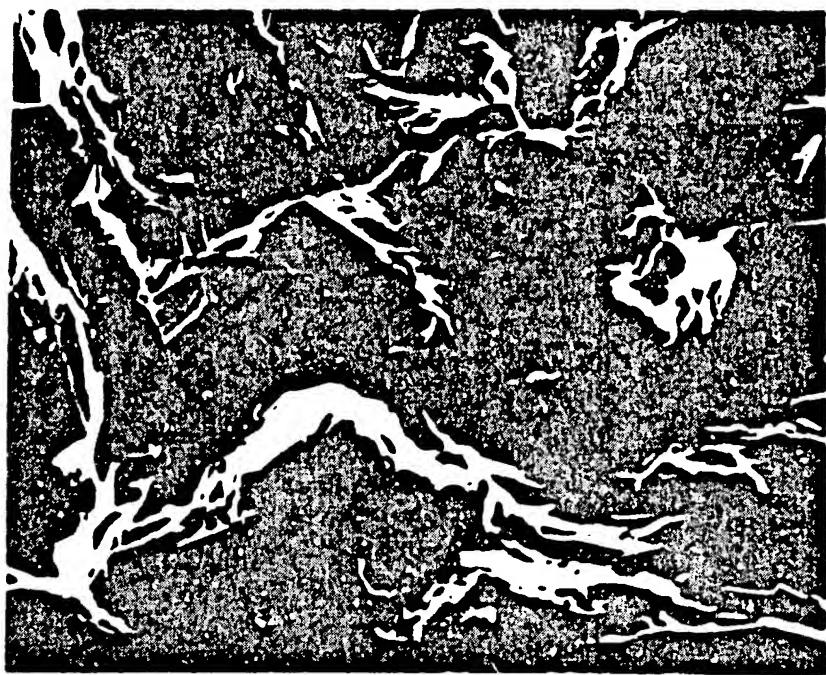


FIG. 4.
AREA SCAN

TI

SI

Figure 16. SEM/EDXA Analysis of Bulk Pr duct fr m Experiment 2



PR= 5 175EC 0 INT
U=4096 H=10KEU 1 10 AD=10KEU 10

FIG. 2, SPOT 1

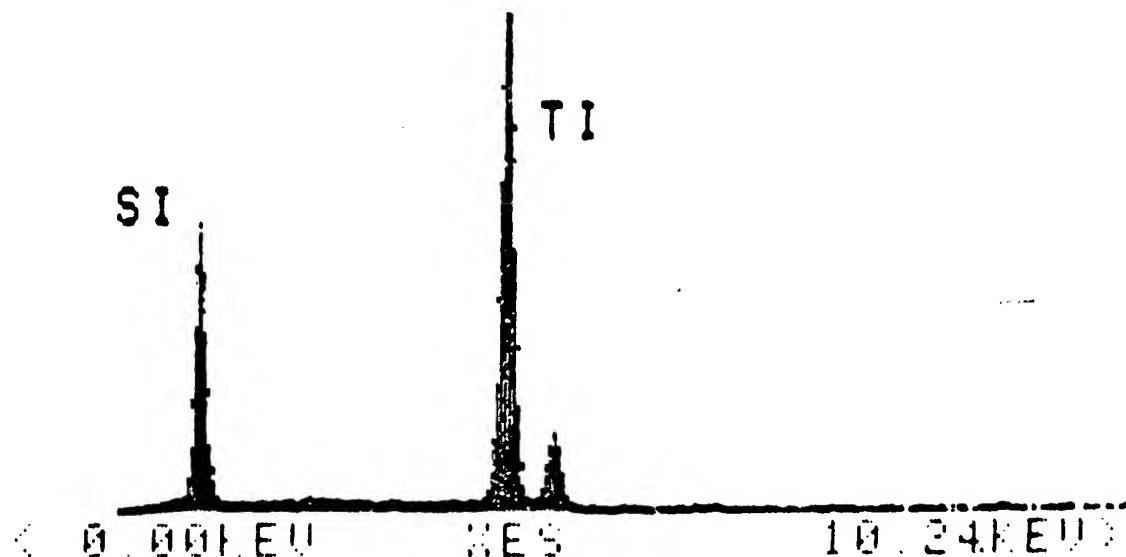
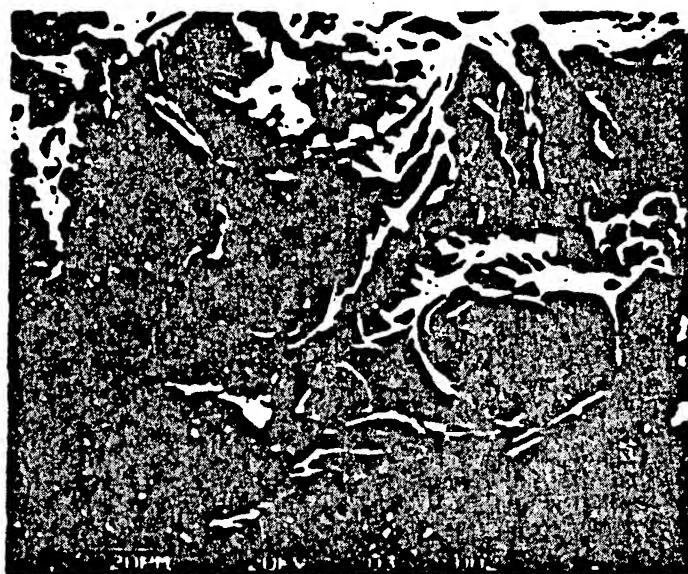


Figure 17. SEM/EDXA Analysis of Crystalline Product from Experiment #2



PF= 5 295ED 0 INT
U=2048 H=10KEV 1:30 AD=10KEV 10

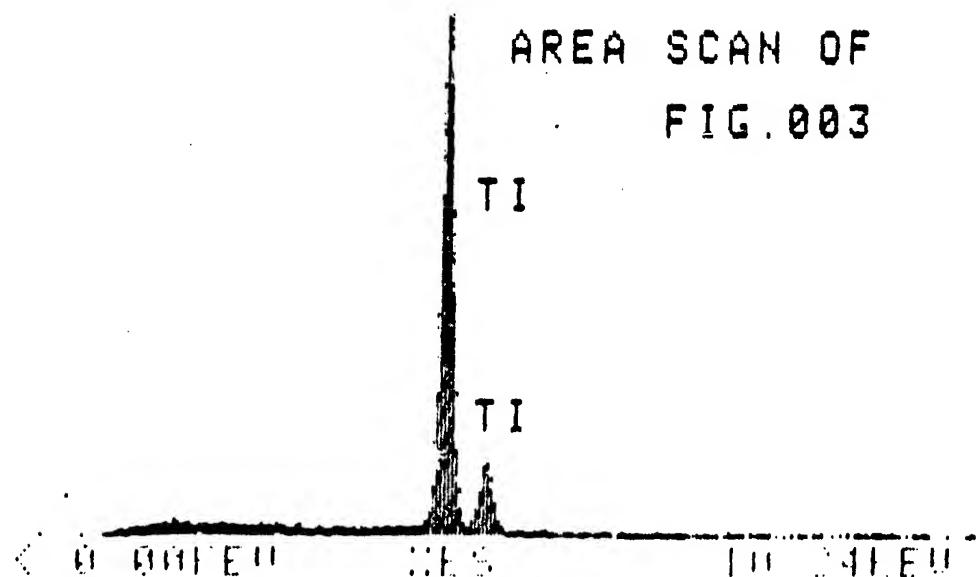


Figure 18. SEM/EDXA analysis of product from Experiment #5. (From first inch of graphite tube)

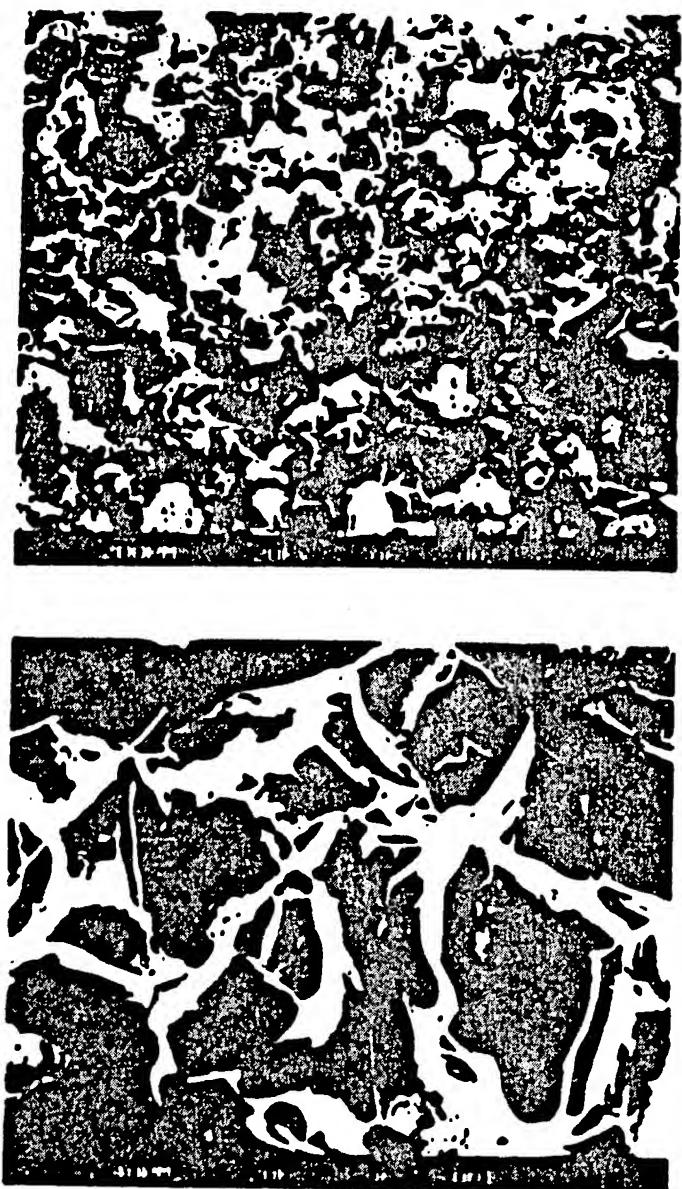
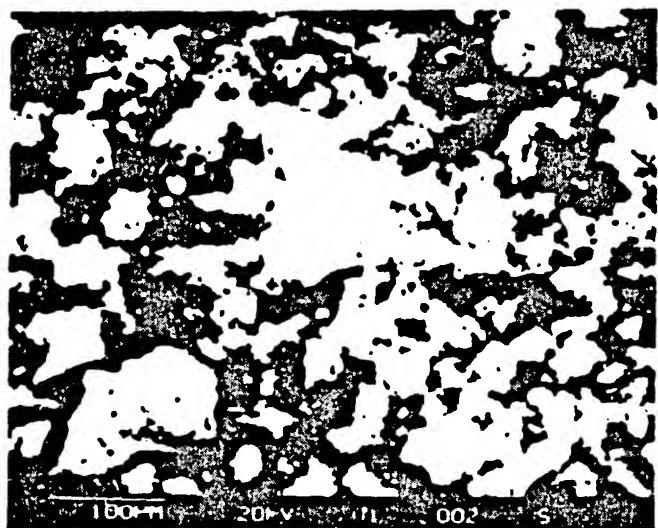


Figure 19. SEM/EDXA analysis of product from Experiment #5. (From first 6" of reaction tube)



FF 5 24SEL 0 INT
U=40KV H=10KV 1:30 AQ=10KV 10

AREA SCAN OF
FIG. 001

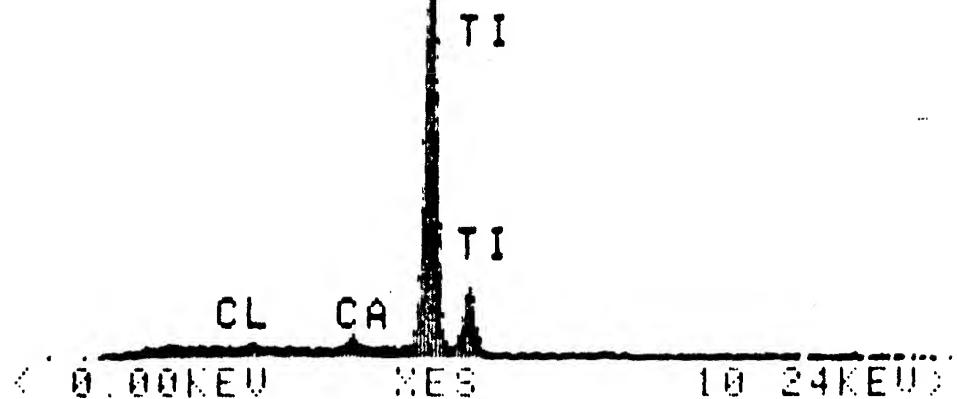


Figure 20. SEM/EDXA analysis of the ultrafine reaction product after leaching away NaCl and sodium - Experiment #5.

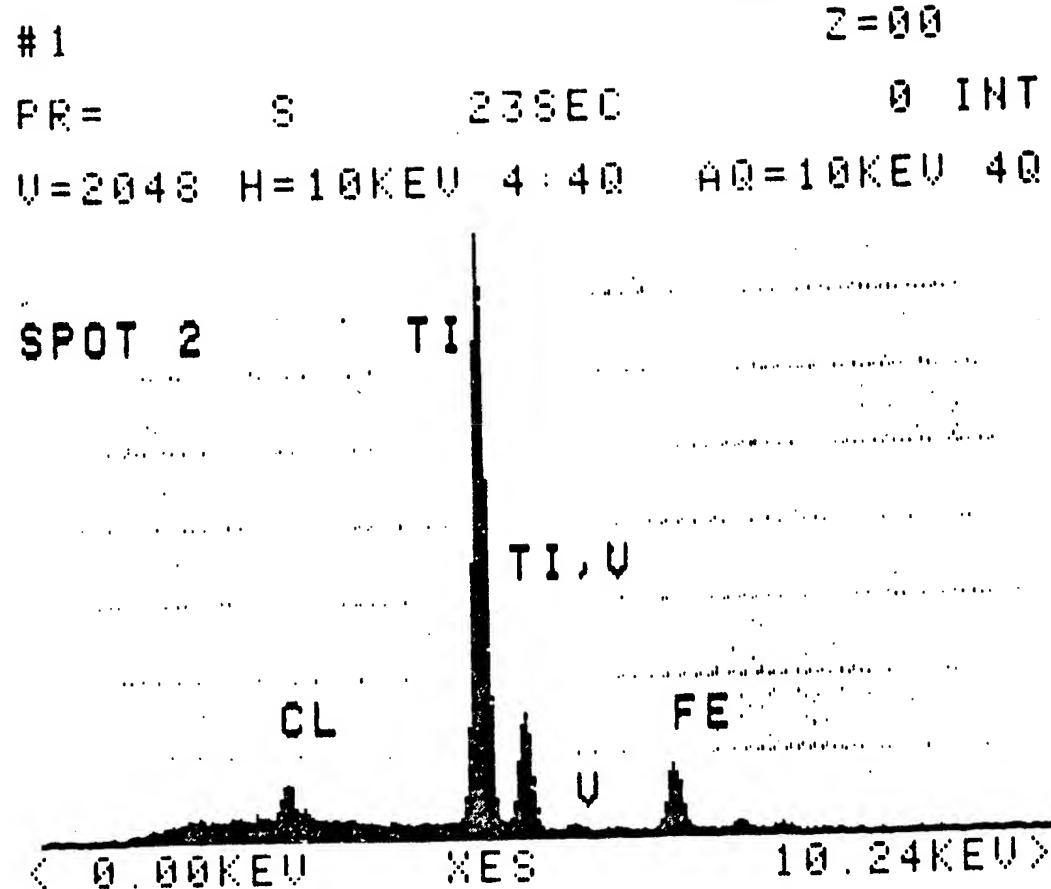


Figure 21. SEM/EDXA analysis of product from Experiment #6.
Titanium-rich area.

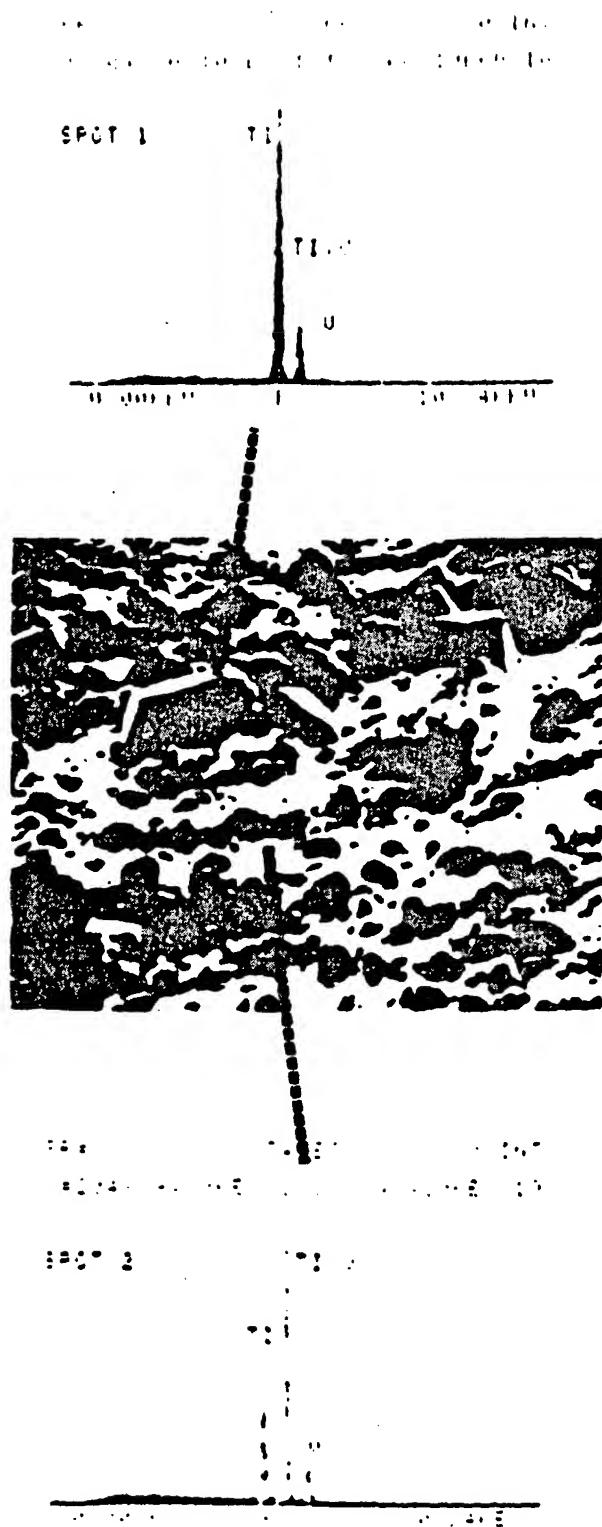


Figure 22. SEM/EDXA analysis of product from Experiment #6. Shows vanadium-rich substrate with titanium-rich crystals.

Dwg. 7750A37

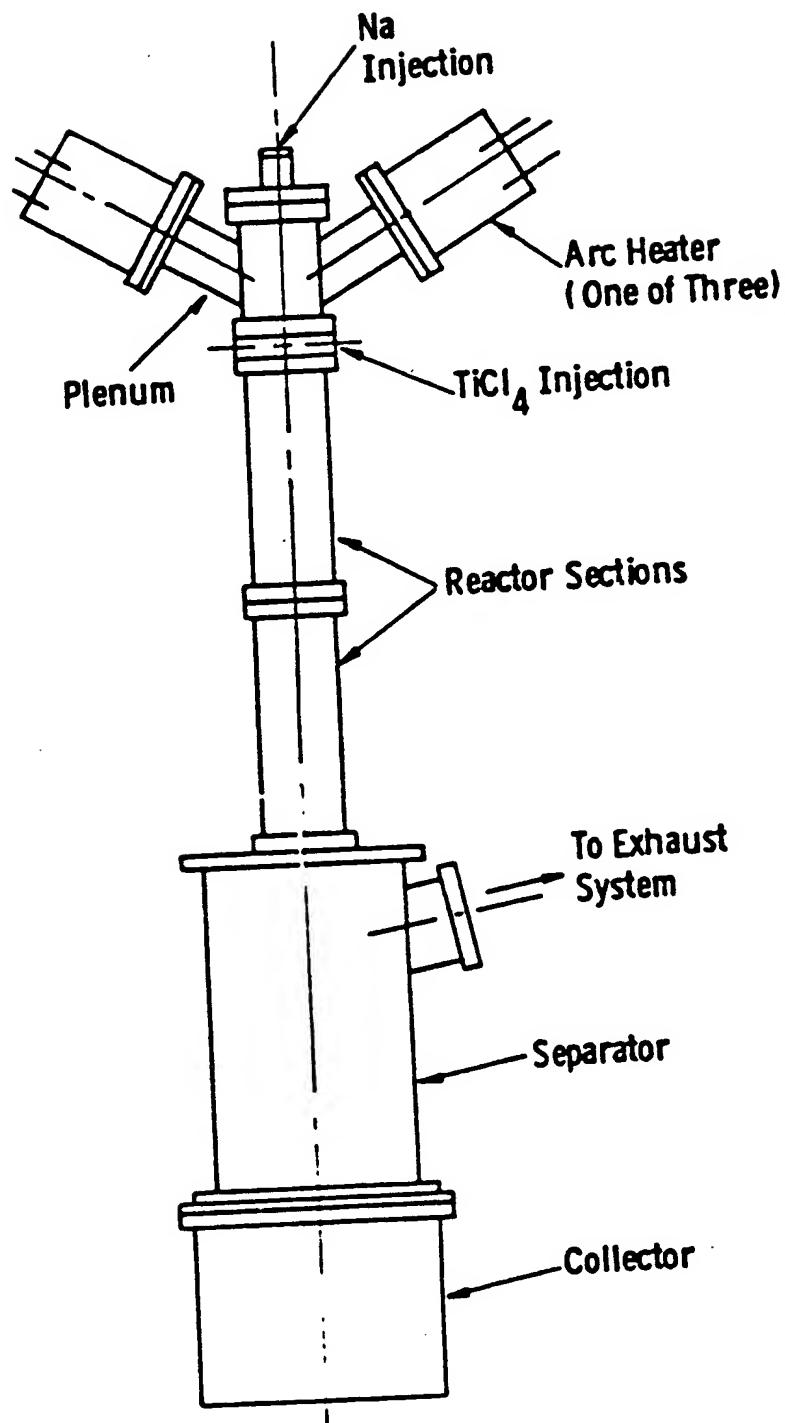


Fig. 23—Plasma reactor for titanium production

END

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